Lab:

Reaction Time

Absent ☐	A	☐ This is me!	Period
Absent ☐	B	☐ This is me!	
Absent ☐	C	☐ This is me!	Group
Absent ☐	D	☐ This is me!	
Absent ☐	E	☐ This is me!	

PURPOSE

To measure your personal reaction time and compare it with the rest of the class.

APPARATUS

☐**your dollar bill** ☐**meterstick**

DISCUSSION

Reaction time is the time interval between receiving a signal and acting on it. For example, the time between a tap on the knee and the resulting jerk of the leg. Reaction time often affects the making of measurements. Consider using a stopwatch to measure the time for a 100-meter dash. The watch is started after the gun sounds and is stopped after the tape is broken. Both actions involve reaction time.

PRE-LAB QUESTIONS

The distance the an object will fall is found using this equation: $d = \frac{1}{2} g t^2$.

1. Since the object is being dropped, the initial velocity is: 0 m/s and we can assume the initial position is height. Which means that the equation will really look like:

2. The letter "a" in the above equation stands for acceleration.

When objects are in free fall, the letter "a" is often written using "g" which stands for the acceleration of gravity.

3. The numerical value for "g" *including units* is 9.8 (m/s^2) (earth), but can be rounded to $10\ m/s^2$ to simplify calculations.

4. Rewrite the equation from #2 and substitute "g" for "a" $d = \frac{1}{2} a t^2 = \frac{1}{2} g t^2$.

5. In this activity, we are attempting to calculate reaction **time**, so solve for the variable "t" using the equation you have written in question 3 in the space below. This will give you the equation to solve for time given acceleration and distance.

PROCEDURE - Every group member should perform each of the following steps. Each member should be able to calculate their own reaction time.

1. Hold a dollar bill so that the midpoint of the bill hangs between your partner's fingers. Challenge your partner to catch it by snapping his or her finger shut when you release it.
2. Have your partner hold a meterstick between your fingers. Move the meter stick so that it is at the **0.50 m mark (or 50 cm mark).** Your partner will then drop the meter stick **unexpectedly** (just like with the dollar bill). Catch it and note the number of meters fallen during your reaction time. *NOTE*: You are NOT using the location of your finger when you caught it, you're using the distance traveled by the meterstick as it was falling. In other words **how far is it from the 50 cm mark**?(Reminder: There are 100 cm in 1 meter stick. Include units.)

The distance (in *meters*) the meterstick fell before you caught it:_____.

Use the equation you got from question 4 to calculate your reaction time, where *y* is the distance fallen by the meter stick. (Show work for credit

Your own reaction time=_____.

`eaction time of your group members and include their names:

Name					
Time					

SUMMING UP

1. Why are reaction times are different for different people? List a couple of reasons.

2. Can reaction time affect how you take measurements using instruments in this class? Can you think of a time when you or someone else had to use reaction time in order to accomplish part of a lab? Explain. (Think of examples!)

3. Let's say you're driving down Gloria at a constant speed of 35 mph (16 m/s). A kid runs in front of you and you slam on your brakes. There's a certain amount of time that passes from the moment you see the kid to the moment you actually touched the brakes. How far did your car travel before you actually hit your brakes?

4. Give at least **two** examples in which reaction time is important in sports. Explain why.

   Example 1:

   Example 2:

5. What must your reaction time be in order to catch the dollar bill? Show work. Recall that the middle of the bill is placed between the fingers. An entire length of a bill is 0.155 m.